

Zanzibar Protectorate.

Annual Report

ON THE

Agricultural Department

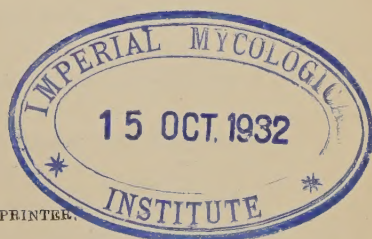
FOR THE YEAR

1931.

ZANZIBAR:

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1932.



Zanzibar Protectorate.

REPORT ON THE AGRICULTURAL DEPARTMENT

FOR THE YEAR 1931.

STAFF.

The following table shows the strength and distribution of the European Staff during the year under review:—

Rank.	Name.	Period in Residence.
Director & Government Chemist	V. H. Kirkham, F.I.C., B.Sc. (London), Dip. Agric. (Cantab)	January 1st to June 9th.
Assistant Director	Harold Waterland, Dip. Agric. (Harper Adams)	Whole year.
Assistant Government Chemist	L. W. Raymond, B.A., B.Sc. (London), A.I.C., A.R.C.S.	Whole year.
Manager of Plantations	Graham Tomson	January 1st to January 29th.
Agricultural Officers	J. E. Baker, Cert. Agric. (Seale-Hayne)	Whole year.
	J. R. P. Soper, B.A., (Cantab.)	January 1st to February 8th, August 13th to December 31st.
	T. D. Rutter, B.Sc. Agric. (London), A.I.C.T.A. (Trinidad)	January 1st to January 6th.
	J. V. R. Brown, B.Sc. Agric. (Edin.), F.S.I.	March 15th to December 31st.
	J. Johns, N.D.A., C.D.A., C.D.D., (Aberystwyth), A.I.C.T.A. (Trinidad)	February 26th to December 31st.
Produce Inspector.	T. M. W. Sheppard.	Whole year.

The year was marked by a number of changes in the staff of the department.

Mr. V. H. Kirkham left Zanzibar in June on privilege leave prior to retirement.

Mr. A. J. Findlay was appointed Director of Agriculture with effect from December 31st, but had not assumed duty at the end of the year.

Mr. H. Waterland was appointed Acting Director of Agriculture from June 9th to the end of the year.

Mr. L. W. Raymond was appointed Acting Assistant Director of Agriculture from June 9th to the end of the year.

On January 30th, Mr. Graham Tomson proceeded to England on grounds of ill health and was subsequently invalided out of the service.

Mr. T. D. Rutter resigned his appointment as an Agricultural Officer and left for England on January 7th.

Mr. R. Johns, Agricultural Officer, arrived in Zanzibar on February 26th on first appointment.

Mr. J. V. R. Brown, Agricultural Officer, on transfer from the Agricultural Department, Sierra Leone, arrived in Zanzibar on March 15th.

At the close of the year the post of Arab Inspector of Plantations was abolished and, in consequence, Mr. Mohamed bin Seif left the department and was placed on pension.

EUROPEAN STAFF IN PEMBA DURING 1931.

Mr. J. E. Baker, January 13th to December 31st.

Mr. J. R. P. Soper, January 1st to 31st and August 25th to December 30th.

Mr. J. V. R. Brown, December 29th to 31st.

THE CLOVE INDUSTRY.

The clove crop for the 1930/31 season was a small one and there are no features of special interest to record in connexion with it. The total crop for the two islands amounted to 2,93,113 frasilas of which Pemba produced 2,19,004. Prices, however, maintained a comparatively high level throughout the year and larger plantation owners benefitted as a result.

Table No. I shows the average monthly prices.

During a season of poor yield the small holder is the chief sufferer: with few, if any, cloves on his own trees and little opportunity of obtaining money by picking cloves for other people, he is largely dependent for his food supply upon such ground provisions as he is able to grow. The quantity that he can produce is, in the first instance, determined by the amount and quality of the land at his disposal that is not carrying fully developed clove trees, the dense shade of which precludes the growth of ground provisions. It follows, therefore, that in addition to his clove area it is desirable for the small holder to possess sufficient suitable land for food crops, which will help him through years of poor clove harvest.

REGENERATION OF THE OLD CLOVE AREAS.

Regeneration of the old clove areas by replacing dead trees and those that are no longer profitable in order to maintain the industry is one of the most important problems with which the country is faced. Various trials made during the past twelve years have failed to indicate a solution of the problem. It was decided, therefore, to invite Professor R. S. Troup, the Director of the Imperial Forestry Institute, Oxford, to visit the Protectorate and advise on the matter. He arrived in Zanzibar on August 2nd and left on August 27th, during which period he visited the principal clove areas in Zanzibar and Pemba. His report had not been received at the end of the year.

THE CLOVE CHAFER.

During Professor Troup's investigations larvæ of a melolonthid (chafer) beetle were discovered attacking the roots of a young clove tree that was in an advanced stage of "die-back". Further search disclosed a few pupæ and adult beetles. Practically all the fibrous roots had been destroyed and the larger roots showed extensive damage which may or may not have been due to the larvæ of this beetle. Other trees of varying ages showing signs of "die-back" were examined and larvæ were found in each case. This insect was subsequently identified as a hitherto undescribed species of the little known scarabæid genus *Indæcamenta*.

To what extent this insect is serious as a pest remains to be determined. At the request of Professor Troup an investigation was made of the distribution and prevalence of the beetle in Zanzibar and Pemba. It was found widespread throughout the clove areas of both islands but not in such numbers in Pemba as in Zanzibar.

BUD DEVELOPMENT OF THE CLOVE TREE.

A preliminary investigation was made of bud development of the clove tree with a view to ascertaining the causes of the tremendous variations in the size of the crop from season to season. Pending further investigations, the following remarks must be regarded as tentative only.

The fruit bud (i.e. clove) is borne upon the last formed wood and not, as in the case of many trees, on wood of a previous season's growth. When a fruit bud has been removed from a shoot the fractured surface is healed by the formation of callus, and another bud is produced which forms wood and continues the growth of the shoot. Under normal conditions this bud continues to produce wood for a period (yet to be determined) during which no clove is formed. Investigations in this connexion continue and must continue over a period of years before any definite conclusions can be formed.

PRODUCE INSPECTION.

The inspection of cloves for export proceeded smoothly and effectively throughout the year. The work is conducted on well-organised lines and causes no inconvenience to exporters. That they (the exporters) have adapted themselves to the conditions imposed upon them by the Agricultural Produce (Export) Decree, 1929, is evidenced by the fact that, of the total number of consignments offered for export, a small percentage only did not comply with the provisions of the Decree and failed to pass the Inspector. Of 1,47,814 bales (representing 2,604 consignments) examined, 98.1 per cent were passed for shipment.

THE COCONUT INDUSTRY.

The quantity of locally produced copra exported during the year amounted to 11,769 tons or 7,53,216 frasilas. As compared with the previous year this represents a decrease of 1,031 tons.

The figures in Table II of the appendix have been supplied by the Comptroller of Customs and show the monthly average price of copra during the year.

There was no improvement in the quality of the copra produced and efforts to arouse the interest of plantation owners in connexion with the matter met with no success.

Though the copra export figures do not reflect it, heavy yields of coconuts were reported during the year. It was generally stated that there was less loss of nuts by theft than formerly (the value of them being so little, they offered less attraction to thieves than when prices were higher), but to what extent this accounted for the increased number of nuts gathered it is difficult to say.

The low value of copra demanded that the cost of production should be reduced as far as possible. The attention of the Department was directed to this end and, after careful investigation, during September the following rates of pay were substituted for those in force on the Government Plantations; plantation owners generally were informed accordingly and advised to follow the lead set by the Government:—

COCONUT GATHERING.

	Rate for 1000 nuts.		Reduction.	Percentage Reduction.
	Old Rate.	New Rate.		
	Rs. Cts.	Rs. Cts.	Rs. Cts.	
(a) Climbing	2 34	1 56	0 78	33.3
(b) Transport to clamps	2 25	2 00	0 25	11.1
(c) Collectors	0 50	0 50	— —	—
	<u>Rs. 5 09</u>	<u>4 06</u>	<u>1 03</u>	<u>20.2</u>

COPRA MANUFACTURE.

	Old Rate.		New Rate.		Reduction.	Percentage Reduction.
	Rs. Cts.	Rs. Cts.				
	Rs. Cts.	Rs. Cts.				
(a) Husking	1 25	1 00	0 25			20.0
(b) Breaking and Drying	2 00	1 75	0 25			12.5
Total	<u>3 25</u>	<u>2 75</u>	<u>0 50</u>			<u>15.3</u>

Thus a reduction of 20 per cent on coconut gathering and 15 per cent on copra manufacture was effected. These rates brought the cost of copra production, tree top to town store, to Rs. 8.12 cents per 10 frasilas, equal to Rs. 56 per ton. At Rs. 2 per frasila for the produce (i.e. the market price to the producer at the close of the year) the producer receives Rs. 128 per ton, which leaves him Rs. 72 for plantation costs, supervision, etc. It takes at least $3\frac{1}{2}$ acres to produce one ton of copra in this country, and the cost of cultivating this area, if carried out in a reasonable manner, would amount to Rs. 35, leaving Rs. 37 (or approximately Rs. 10.5 cents per acre) to cover overhead charges (i.e. supervision, repairs to buildings, roads, etc.) interest on capital and the owner's recompense.

The reduced rates of pay permitted of adequate wages being earned by the labourers concerned as explained below:—

- (i) Climbing.—An average day's climbing is 60 trees. Work of this nature is plentiful and a man can find full-time employment. Allowing 26 working days Rs. 25.4 can be earned per month.
- (ii) Transport to Clamps.—At the low figure of 600 nuts gathered per day, Rs. 1.20 per day or Rs. 24 per month of 20 working days can be earned by a donkey or bullock owner.
- (iii) Husking.—A man can without difficulty husk 1,000 nuts per day and so obtain Rs. 20 per month of 20 working days.
- (iv) Breaking and Drying.—At the low figure of 600 nuts per day a man can earn Rs. 21 per month of 20 working days.

As a general rule work under (ii), (iii) and (iv) allows full-time employment and the figures given are conservative.

CLOVE GROWERS' ASSOCIATION.

Financial assistance to plantation owners was rendered through the Clove Growers' Association in two ways, viz:—

- I. Harvesting loans to enable plantation owners to conduct harvesting operations.
- II. Cash advances upon the security of cloves deposited with the Association for free storage.

In 1930 the Secretary of State authorised a total of Rs. 7 lakhs to be placed at the disposal of the Association for the above purposes. Of this sum there remained at the end of 1930 a balance of Rs. 5,90,823-13 cents owing by the Association to the Treasury. During the early part of 1931, Rs. 4,25,130 was repaid to the Treasury, leaving a balance of Rs. 1,65,693-13 cents.

During the year under review Advisory Boards were convened in both Zanzibar and Pemba to assist the Director of Agriculture in connexion with the transactions of the Association. The Zanzibar Advisory Board advised and the Government approved of Rs. 2½ lakhs, in addition to the unrefunded balance of the sum authorised in the previous year, being provided to continue financial assistance to plantation owners during 1931.

I. HARVESTING LOANS.

Loans to enable plantation owners to commence harvesting operations have been given for many years. Formerly the loans were given without security and were regarded as debts of honour by the parties concerned. In more recent years the loans were granted on written agreements under which the borrower promised to repay the money at a given date and undertook to dispose of his clove crop through the sales organization of the Association. It eventually transpired that the agreements did not give adequate security for the money advanced, and, in order to strengthen the position of the Government in this respect, the Transfer of Agricultural Produce Decree, 1931, was enacted, which introduced the chattel mortgage as security, and harvesting loans were granted during the year in

accordance with the provisions of this Decree. The borrower gave a chattel mortgage on his clove crop. Should he default in repaying the loan, the Government had the right to seize his crop wherever it might be. If the crop was beyond recovery, the borrower rendered himself liable to imprisonment for fraud.

All applications for harvesting loans were considered by the Advisory Boards and the granting thereof was not left solely to the discretion of the Director of Agriculture as hitherto.

One hundred and thirty-two plantation owners availed themselves of the assistance offered and a sum of Rs. 17,297 was disbursed. At the end of the year Rs. 16,782 had been refunded, leaving a balance of Rs. 515 outstanding.

Recovery of Harvesting Loans Granted in Previous Years.

These loans were of two classes:—

(a) Those made by Government during 1924-27, before the formation of the Clove Growers' Association. Rs. 2,406-56 cents were owing on 1st January, 1931. Most of the debtors are deceased or insolvent. A sum of Rs. 231-55 cents was recovered, and the greater part of the balance of Rs. 2,175-01 cent must be regarded as a bad debt.

(b) Those made through the Clove Growers' Association during 1928-30. Of Rs. 12,363-70 cents owing on 1st January, 1931, Rs. 10,505-12 cents were recovered and Rs. 285 were written off as irrecoverable, leaving a balance of Rs. 1,058-58 cents most of which is recoverable.

II. CASH ADVANCES UPON THE SECURITY OF CLOVES DEPOSITED FOR FREE STORAGE.

Cash advances against cloves deposited for free storage fell under two categories:—

(i) Advances to encumbered persons, i.e. persons who deposited cloves with the Association during the previous season and who had received advances in excess of the present market value of their cloves. They owed to the Association the difference between the market value of their produce and the money advanced plus charges.

(ii) Advances to unencumbered persons, i.e. people not in debt to the Association.

(i) Advances to Encumbered Persons

At the beginning of the year the rapid fall in clove prices caused much anxiety as it was feared that the price might fall to a point where the money advanced during the previous season would exceed the market value of the cloves deposited as security for it, and remaining unsold.

It had been ruled by the Government that the whole of the money advanced should be refunded to the Treasury by the end of June. To hold the stocks in the hope of a rise in price would most probably

necessitate selling ultimately in large quantities and was therefore likely to affect adversely the market; it was decided eventually to sell such a proportion weekly that the whole should be disposed of by the date stated. When a movement was made to this end it was discovered that, legally, the cloves could not be sold without the owners' consent as no agreement had been entered into giving this power. To obtain the consent of owners, meetings were held in Zanzibar and Pemba but little success was met with as the owners disliked the idea of selling on a falling market.

In June the price of cloves fell to less than Rs. 9 per frasila, and the fear that the money advanced would exceed the value of the produce was realised. At this period the position was as follows:—

		Frasislas.
Cloves held in storage	...	12,854
		Rs.
Market value of above	...	1,15,686
Money advanced on above	...	1,42,567
Money to be recovered in respect of cloves sold and which did not realise the amount advanced upon them	...	3,340
Total amount outstanding and to be recovered	...	1,45,567*

*To this amount must be added a sum of approximately Rs. 6,427 to cover the cost of handling, brokerage, insurance, etc.

The depositors were not in a position either to refund the money advanced and remove their cloves or to pay the difference between the market value of the cloves and the cash advanced against them. The attitude of many was that the Association held their cloves and could recover the money in due course if the produce were retained until prices rose sufficiently high for the advances to be secured. The new clove crop was being picked in Zanzibar and the crop in Pemba ripening rapidly; plantation owners needed all their available money for harvesting purposes, and it was felt that, at this stage, to press for repayment of the advances would be a drastic step to take and liable to make the Association very unpopular. It was considered desirable that a means should be devised which would enable depositors to recover from their embarrassment without undue hardship and, at the same time, permit them to retain the free storage facilities; in other words, any scheme devised should be made as attractive as possible. The matter was considered by Government and it was finally decided to offer the following concessions to the embarrassed depositors:—

On signing an agreement to deposit a quantity of cloves equal to the quantity already held by the Association on their behalf, encumbered persons could receive cash advances as explained below. The basis of valuation of the cloves was Rs. 7 per frasila and money advanced at this rate was considered to be adequately secured. The system under which advances were given in this way may be illustrated in its simplest form as follows:—

During the season 1929-30 a person deposited one frasila of cloves with the Association and received advances (including a converted

harvesting loan) amounting to Rs. 12 per frasila; in June, 1931, this was in excess of the market value of the cloves. After that he brought another frasila of cloves for storage and received an advance of Rs. 2. He thus had two frasilas of cloves deposited with the Association and had been given advances totalling Rs. 14 or Rs. 7 per frasila, which was regarded as adequate security. The owner was given free storage facilities for the total stock for six months, after which the Government held the power to sell the cloves and recover the money advanced plus charges for handling, brokerage, insurance, etc., which amounted to approximately six to eight annas per frasila.

With the exception of six who were not available, the writer interviewed individually all embarrassed depositors and explained the advantages of the scheme to them. They generally expressed themselves in favour of it and promised either to pay cash as the new clove crop put them in funds or to deposit more cloves to cover their debts. The majority availed themselves of the opportunity offered and brought in cloves to reduce the rate of advance against their total holdings to Rs. 7 per frasila. At the close of the year the position regarding these depositors was as follows:—

	Rs.	Cts.
(a) Unsecured, all cloves sold (note 1)	3,935	36
(b) Partly secured (note 2)	60,592	51
(c) Secured (note 3)	29,356	26
Total Rs.	93,884	13

Notes :—

- (1) Extensions of time to pay were given in certain cases for special reasons. Summonses were taken out in other cases.
- (2) Against this Rs. 60,592-51 there were 5,524 frasilas of old cloves and 974 frasilas of new cloves in stock, a total of 6,498 frasilas. Valued at Rs. 7 per frasila these were worth Rs. 45,486. The balance unsecured was therefore Rs. 15,106-51. To this must be added Rs. 2,219-92, the amount advanced on the 974 frasilas of new cloves (deposited in accordance with the "reduced advances" scheme) making the total unsecured Rs. 17,326-43.
- (3) This sum of Rs. 29,356-26 was covered by 3,053 frasilas of old and 2,440 frasilas of new cloves, a total of 5,493 frasilas. A further advance of Rs. 68 was secured on the new cloves. Valued at Rs. 7 per frasila the cloves, old and new, were worth Rs. 38,451.

(ii) *Advances to Unencumbered Persons.*

Plantation owners were permitted to deposit cloves with the Association for six months' free storage and were given cash advances up to, and not exceeding, Rs. 5 per frasila on them as security. By agreement the Association held the right to sell the cloves after a period of six months and to recover from the proceeds of the sale the amount of cash advanced plus the cost of handling, brokerage, insurance, etc. On December 31st 63,174 frasilas of cloves had been deposited by 311 plantation owners, and on the security of this produce a sum of Rs. 2,77,289-36 had been advanced.

The following summarises the position as at 31st December, 1931:—

Operations of 1931 Season.

(1) <i>Storage Advances.</i>		Rs.	Cts.
Advances made	2,79,577	28	
Advances outstanding	2,56,311	58	
(2) <i>Harvesting Loans.</i>			
Loans made	17,297	00	
Loans outstanding	515	00	
Total payments	2,96,874	28	
Total outstanding	2,56,826	58	

Total outstanding at 31st December:—

	Rs.	Cts.
Storage Advances, previous seasons	93,883	13
Storage Advances, 1931 season	2,56,311	58
Harvesting Loans, previous seasons	1,058	58
Harvesting Loans, 1931 season	515	00
Total	3,51,769	29

Tables III and IV in the appendix show the operations of the Association during the year and the balance sheet.

H. WATERLAND,
Acting Director of Agriculture.

ANNUAL REPORT OF GOVERNMENT PLANTATIONS, ZANZIBAR, 1931.

Staff.—Mr. Graham Tomson, the Manager of Plantations, proceeded on sick leave on the 30th January, 1931, and finally retired on medical grounds on the 1st August, 1931.

Sheikh Mohamed bin Seif bin Salim el-Busaidi, Inspector of Plantations, acted as Manager of Plantations from 30th January, 1931, until the end of the year.

Mr. Robert Johns, Agricultural Officer, assisted in the management of the plantations from the 1st May, 1931, until the end of the year.

The headquarter office staff was augmented during the period and at the end of the year consisted of one 2nd grade clerk, one 3rd grade clerk and one learner.

The plantation field staff was considerably augmented, several pupils were promoted on to the permanent staff as assistant overseers.

It is with regret that the death on 27th September of Faraji bin Miro, Head Overseer, Mtoni Group, is recorded. His death removed a capable and faithful member of the plantation staff.

Climatic Conditions.—The total rainfall for the year was above the average. Rain fell during each month of the year, but the heavy rains fell before clove picking commenced. The harvest weather was comparatively good and what rain did fall, did not materially affect clove drying.

Table I gives details of rainfall at the various recording stations.

TABLE I.

Month.	Town.	Selem.	Kidichi.	Koani.	Mkokotoni.	Chwaka.
January	2.54	1.86	1.29	0.68	1.31	1.75
February	10.93	6.27	10.99	4.99	5.57	6.40
March	3.05	8.67	8.03	5.83	7.05	4.60
April	14.35	10.92	12.83	18.35	15.37	13.14
May	19.42	15.41	24.32	15.67	14.48	21.16
June	0.94	1.71	1.46	2.84	3.14	2.40
July	1.12	1.71	1.23	2.32	0.52	1.88
August	0.66	3.60	4.03	3.40	1.41	2.15
September	2.86	2.69	1.61	1.02	1.46	0.30
October	3.00	2.21	2.36	2.54	1.40	0.67
November	5.52	6.62	5.47	7.81	0.88	0.65
December	7.39	5.33	4.57	8.89	3.54	1.92
	71.78	67.00	78.19	74.34	56.13	57.02

Labour.—The hoeing, cutlassing and general routine work is done by the mainland tribesmen, Wasukuma and Wanyamwezi. They are a very useful community, as they usually squat on Government land and become permanent labourers during the off season and excellent clove pickers during clove harvest.

Coconut tree climbers, gatherers, collectors, huskers and driers are usually procured from the local community. This type of work is done by piece work and is popular amongst the locals. Permanent daily labour on plantations does not attract them.

Clove pickers comprised permanent labourers, squatters, and outsiders. Outsiders come in and pick the flush of the crop, then move on to another estate, where they pick the flush of that crop. The bulk of the year's crop was picked by the permanent labour staff and squatters. The squatters undoubtedly played their part in recording such a good harvest, and they certainly earned the right to squat free on Government land. A good atmosphere prevailed between the squatters and the plantations staff and they were moved freely from centre to centre.

There were very little labour difficulties throughout the year; a shortage of pickers occurred only on occasions.

An attempt was made during the year to lower the costs of copra production. The majority of operators fell into line, but the Kizimbani tree climbers refused the new terms and declared a strike. The strike caused considerable inconvenience and threw the routine manufacture of copra out of gear to such an extent that on some estates the fourth gathering was missed. Under the circumstances it was more economic to pay the requested rate and continue with the manufacture of copra. This policy was adopted.

CROPS.

(a) *Cloves*.—The clove harvest proved a satisfactory one and exceeded expectations. The trees bore a good crop and every endeavour was made to harvest as much as possible in view of the prevailing low prices.

Clove picking commenced in late May and dwindled on until December. Picking commenced at four pice per pishi, but prices rose rapidly with the flush of the crop and eventually nine pice were paid.

The good crop was general throughout the plantations. There was a certain amount of variation in the ripening of the crop. The crop on the Masingini, Mgongowangamia Ridge, ripened early, while the Machui crop ripened much later.

The following tables show the quantities of cloves picked and the prices realised:—

TABLE II.

Group.	Quantities picked.		Prices realised.	
	Frs.	lbs.	Rs.	Cts.
Machui	5,823	23	54,538	99
Kizimbani	4,665	30	43,209	89
Selem	7,045	25	63,379	83
Mtoni	350	01	3,345	33
Chukwani	13	25	124	12
Total	17,898	34	1,64,598	16

TABLE III.

Group.	STEMS.		Prices realised.	
	Frs.	lbs.	Rs.	Cts.
Machui	1,137	32	2,367	15
Kizimbani	725	27	1,406	94
Selem	1,317	15	2,871	49
Mtoni	78	11	146	65
Chukwani	83	30	6	75
Total	3,263	10	6,798	98

The following estates were leased during the year:—

TABLE IV.

Estate.	No. of Trees.	Amount realised.	
		Rs.	Cts.
Kichwele	37	7	00
Kidogobasi and Mwera Bridge	34	16	00
Jangombe	7	20	00
Pangeni and Mgonjoni	20	5	00
Bet-el-Ras	42	20	00
Basra	5,800	13,000	00
Total	5,940	13,069	00

Cultivation.—During the year cultivation was reduced to cut-lassing with ring cultivation around young seedlings.

Regeneration.—Continuous deaths occurred amongst clove trees from varying causes. Attempts were made to regenerate the dead areas by planting up gaps with young seedlings. To a certain extent this method has been successful, but there is a tendency to produce “leggy” seedlings.

(b) *Coconuts.*—With such low prices prevailing for copra, cultivation was reduced to cutlassing and ring weeding around young seedlings.

Attempts to regenerate in some of the open spaces has not been too successful and it appears that all land which will carry coconuts has been planted up.

(c) *Copra.*—Special attention was given to the copra industry during the year with the view of improving the quality. An attempt had been made in previous years, on a small scale, to produce kiln dried copra. During 1931 it was decided to increase the number of drying kilns and scatter them throughout the plantations with the idea of attempting to convert all the nuts into copra. With this point in view several kilns were built, but even at the present time we are unable to deal with the crop, so necessitating the sale of the surplus nuts in the clamp.

The kilns consist of a drying platform of corrugated iron covered with sand and finally with the mid-ribs of coconut leaves. This type of kiln is very effective and first-class produce can be produced in

five or six days. There are certain variations in this type, and a certain amount of experimental work is being done to ascertain the best type. To-date the best type appears to be the drying floor with a central draught shoot and four firing places; as it facilitates a more even distribution of heat, and with the four firing places the stoker is able to take advantage of any prevailing wind. This type has preference to the type with one firing place and the draught shoot at the opposite end, inasmuch as it is much speedier and reduces the drying time by more than 24 hours.

Some first-class copra has been produced and attempts are being made to standardize the quality; difficulty has been experienced in doing so as the type of labour employed has not been up to the task. Considering this is a new type of work and requires certain amount of forethought in the matter of firing, the available labour has done well and with further experience, there should be no reason why all copra produced should not be of first quality. The copra produced on Government plantations commands the best price in the local market and realises three and four annas per frasila more than the best Zanzibar produce.

Excellent copra can be produced by drying in the sun, but the Zanzibar weather is too unreliable for this method. A small shower of rain will reduce a consignment of copra to second grade quality, as with a little moisture, moulds develop and darkens the colour.

The following table shows the quantity of copra produced and the prices realised:—

TABLE V.

Group.	Quantities.		Prices realised.	
	Frs.	lbs.	Rs.	Cts.
Machui	4,471	10	9,517	64
Kizimbani	10,513	12	21,554	20
Selem	4,077	16	9,121	85
Mtoni	5,816	30	11,853	90
Chukwani	3,034	16	6,253	35
Total	27,913	14	58,300	94

Buildings.—Sundry repairs to the houses and drying floors were carried out during the year. No new buildings were constructed.

ROBERT JOHNS,
Agricultural Officer.

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1931.

Clove Crops.—The clove crops of 13 plantations were leased.

The crops of the five bigger plantations were harvested by the department. 2,941 frasilas of cloves shipped to Zanzibar realised Rs. 29,144 51 cts.

By the end of the year all the rents for clove crops had been collected and paid into the Sub-Treasury.

Coconut Crops.—All the coconut crops were put up for auction in 1931 with the exception of Tundaua.

The coconut crops of 13 plantations were leased, and the rents were paid quarterly. The lessees of five plantations defaulted, in most cases in the third and fourth quarters rents, and the nuts were picked by the department.

The crops of ten small outlying plantations were picked by the department as no offers were received for them at the auction.

Clove Regeneration.—On the area cleared of old clove trees at Matangatwani in 1930, 440 clove seedlings were planted during the rains. The area was covered with cassava; lines were cut through this crop when the cloves were planted, the rest was left as a cover crop.

Two areas at Mpona which were covered with bracken were cleared, holed, and planted with cloves, altogether 220 seedlings were planted.

The clove seedlings are all doing very well and making rapid growth.

Nurseries.—Clove nurseries were laid down in 1930, and seedlings were planted according to applications received from members of the public.

In some cases, however, the seedlings were not collected by the applicants in 1931 and it is proposed to abolish some of the nurseries in 1932.

Nursery.	Planted 1930 seedlings.	Ready for planting out 1931.
Matangatwani	3,000	440 planted in the shamba, rest collected by applicants
Mpona	2,000	220 planted in the shamba, the rest were not collected
Minyenjeni	5,000	Applicants have promised to collect during rains of 1932
Makondeni	3,000	All collected
Mkanjani	5,000	Not collected
Fufuni	5,000	Not collected, but will be used by the Department to plant up open spaces in 1932
Chem Chem, Wete	1,000	Collected

In 1931 the following clove nurseries were laid down:—

	Seedlings.
Matangatwani	3,000
Makondeni	3,000
Kiuyu	1,000

Although most of these have been applied for, it is proposed to carry out further regeneration work at Matangatwani and Makondeni so that if the applicants default the seedlings will be used.

A small nursery was prepared at Kiuyu for *Hydnocarpus Wightiana* seed; 1,740 seeds were sown, but only 56 germinated. About that time an Arab applied for 1,000 clove seedlings in that district, so clove seedlings were planted in the nursery prepared for *Hydnocarpus Wightiana*.

Hydnocarpus Wightiana.—At the end of 1930 a large supply of *Hydnocarpus Wightiana* seeds were received and sown in nurseries; the germination was extremely poor; details are given below:—

	Seeds sown.	Germinated.
Makondeni	1,040	31
Mpona	330	32
Kiuyu	1,740	56
Tundaua	4,000	35
Fufuni	3,000	26
Total	10,110	180

It was proposed to plant up some of the poor land in Pemba, but as so few plants resulted they were planted in small patches in Government plantations.

The few seedlings produced were very healthy and vigorous and after they were planted out made very good growth. They were planted in the following plantations:—

Kiuyu	28
Matangatwani	28
Makondeni	31
Mpona	32
Wesha	35
Fufuni	26

Towards the end of the year, in the interests of economy, the weeders and waterers at Mkanjuni were withdrawn and a man sent occasionally to clean and weed. Some of the other nursery staffs were reduced to one man each.

Copra.—During the year 2,00,581 frasilas of copra were exported from Pemba. The quality of the native produce leaves much to be desired and it is doubtful if any improvement will be made until legislation is introduced on the lines of The Agricultural Produce Export Decree of 1929. A small demonstration kiln of 400-nut capacity was erected at Mtangatwani in 1930 but attracted little attention.

The kiln consists of a pit with steps leading down it. A few sheets of corrugated iron forms the top which is covered with sand and split bamboos.

Copra Factory, Tundaua.—2,05,230 nuts were gathered on the Tundaua plantation in 1931.

740 frasilas of copra have been produced from the first and second gatherings.

The work was held up during the last five months of the year on account of the clove harvest on that plantation.

The third and fourth gatherings are now being husked and broken; 141 frasilas of copra have been prepared to date.

J. E. BAKER,
Agricultural Officer, Pemba.

(4) The following figures show the destinations of cloves exported in 1931:—

	Net Frasilas.
Dutch East Indies	2,90,755
India	1,92,160
America	92,979
Great Britain	36,416
Continent of Europe	33,091
Strait Settlements	9,542
Africa	7,891
Japan	7,405
New Zealand and Australia	5,875
Canada	4,835
Asia	3,806
China	2,275
South America	861

The exports to the Dutch East Indies are used mainly in the manufacture of cigarettes, those to India for spice, and those to Europe and America for spice and distillation purposes.

III. EXPORT INSPECTION OF CLOVES.

Month. 1931.	Presented for inspection.		Passed.		Failed.	
	Bales.	Consign- ments.	Bales.	Consign- ments.	Bales.	Consign- ments.
January	4,297	83	4,267	82	30	1
February	6,620	103	6,620	103	30	1
March	7,492	114	7,492	114	—	—
April	8,787	114	8,787	114	—	—
May	6,263	100	6,263	100	—	—
June	5,173	82	5,168	81	5	1
July	17,519	322	16,538	300	981	22
August	19,406	355	18,660	336	746	19
September	14,714	277	14,366	271	348	6
October	14,167	264	13,812	255	355	9
November	29,073	493	28,873	488	200	5
December	14,303	297	14,202	295	101	2
Total	1,47,814	2,604	1,45,048	2,539	2,766	65

The percentage of consignments which failed is thus about 2.5 per cent and of bales 1.9 per cent.

(2) In the inspection 50 per cent of the bales in every consignment were sampled and examined.

In 1,446 cases samples were submitted to the Government Chemist. Of these 65 failed to reach the standard laid down in the Agricultural Produce Export Decree, 1929—16 per cent moisture and 5 per cent extraneous matter.

The average moisture for samples passed was 13.8 per cent and extraneous matter 3.2 per cent.

The practice of submitting a large number of samples to the Government Chemist in addition to samples from all doubtful consignments minimises the possibility of a consignment below standard being passed.

Many merchants, particularly those shipping to the Dutch East Indies and America, now request a copy of the Export Certificate for which they pay Re. 1. Due notice is given of this request so that samples of the consignments concerned can be submitted to the Government Chemist for examination and verification.

IV. CLOVE GROWERS' ASSOCIATION.

(1) The Produce Inspector has throughout the year supervised and checked the work of the godown keepers and taken a census of stocks each month.

(2) Samples were taken of the majority of the clove consignments from Zanzibar and Pemba to note quality and moisture content.

(3) The stock in the Clove Growers' Association godowns at the end of the year was 22,028 bags and in the sales godown 827 bags.

V. COPRA EXPORT.

(1) The Produce Inspector has made a careful survey throughout the year of the copra export, with a view to possible inspection in the future

The total export was 2,20,015 bags of 140 lbs. the destination being:—

	Bags.
Genoa	1,12,425
Marseilles	1,06,250
Hull	1,340

(2) The quality is still very poor.

Shipments are generally described as "fair merchantable" quality. The average quality is improved by mixing "fair merchantable sundried"—obtained chiefly from the mainland (re-export) and Government Plantations—with inferior local produce.

T. M. W. SHEPPARD,
Produce Inspector.

Zanzibar, 27th January, 1932.

REPORT OF THE GOVERNMENT CHEMICAL LABORATORY FOR THE YEAR 1931.

1. STAFF.

The Director of Agriculture and Government Chemist went on leave, prior to retirement, on 9th June, and the Assistant Government Chemist was responsible for the Chemical Branch of the Department from that date and also acted as Assistant Director of Agriculture in addition to his normal duties. In August he was appointed Secretary of the Clove Industry Advisory Board.

2. EQUIPMENT.

The equipment of the laboratory was maintained and slightly extended, the most notable additions being a "Hanovia" analytic quartz lamp—an instrument which is being increasingly used in many branches of analytical practice—and a third four-compartment Brown-Duvel moisture tester.

3. CHEMICAL WORK.

The number of samples dealt with constituted a record, the previous highest figure being 1,172 in 1927.

The total number of samples received was 1,698.

These samples were received from Departments of the Government and other sources as shown in Table I.

TABLE I.

Department.	1st quarter.	2nd quarter.	3rd quarter.	4th quarter.	Total.
Agriculture	214	232	594	500	1,540
Health	31	30	17	22	100
Police	12	—	6	7	25
Customs	9	3	2	—	14
Other Departments	—	—	3	—	3
Total Government	266	265	622	529	1,682
Private samples	5	1	5	5	16
Total	271	266	627	534	1,698

A sum of Rs. 130 was received by Government in fees for analyses carried out for private firms or individuals, and Rs. 137-50 cents for certified copies of certificates of quality in respect of 29 samples of cloves taken by the Produce Inspector from consignments presented for export: in all Rs. 267-50 cents.

The details of the Government samples are as follows:—

Agriculture.—Cloves (export), 1,446; cloves (Clove Growers' Association), 48; cloves (other), 4; clove leaves, 36; citrus fruits, 6; Total, 1,540.

Health.—Soda water and sweetened mineral waters, 73; cattle dips, 15; toxicological exhibits, 5; medicine, 1; drinking water, 2; other samples, 4; Total, 100.

Police.—Spirits and other liquids for alcohol, 9; exhibits for opium, 5; exhibits for bhang, 3; toxicological exhibits, 8; Total, 25.

Customs.—Liquors, 1; essences, 8; perfumes, 3; medicines, 2; Total, 14.

Other Departments.—Electricity and Wireless, three samples of water.

NOTES.

(1) *Agriculture.*—The new policy introduced in 1930 under which the Produce Inspector submits for analysis a large number of samples from consignments the quality of which appears satisfactory in addition to samples from all doubtful consignments not only minimises the possibility of a consignment below the standard being passed for export but also enables an approximate estimate to be made of the average quality of exported cloves. From the figures given below it will be seen that in respect of moisture and foreign matter the quality has been very satisfactory, and there is no doubt that the careful inspection of all cloves presented for export has done much to improve the quality of cloves shipped from Zanzibar and to restore the confidence of overseas markets, thereby materially assisting in meeting competition.

Of the 1,446 samples of cloves submitted by the Produce Inspector from consignments presented for export, 19 were examined for moisture only, two for foreign matter only and 1,425 for both moisture and foreign matter. Of the 1,444 samples examined for moisture 1,379 were passed and 65 rejected, the distribution of moisture content being as follows:—

Passed	Moisture.	Number of samples.	
	Not exceeding 10%	3	
	10.1—11%	30	(lowest 9.6%)
	11.1—12%	74	
	12.1—13%	279	
	13.1—14%	421	
	14.1—15%	371	
	15.1—16%	201	
Rejected	16.1—17%	49	
	17.1—18%	15	
	18.1—19%	1	(highest 19.0%)

The average moisture content of the 1,379 samples passed was 13.8 per cent. Of the 1,427 samples examined for foreign matter 1,426 were passed, the distribution of foreign matter content being as follows:—

Passed	Foreign matter.	Number of samples.	
	1.1—2%	36	
	2.1—3%	569	
	3.1—4%	672	
	4.1—5%	149	
Rejected	5.1—6%	1	(5.5%)

The average foreign matter content of the 1,426 samples passed was 3.2 per cent.

The great majority of consignments of cloves brought in for storage by members of the Clove Growers' Association were inspected either in Zanzibar or Pemba, and a note was made of their quality. Deductions were made in the case of wet consignments when calculating the amount of the cash advance to be paid to the owners. Samples were submitted for analysis in 48 cases, of which 23 were

examined for moisture only and 25 for moisture and foreign matter. Of the 48 samples examined for moisture 21 contained 16 per cent or less and the remainder contained excessive moisture as follows:—

Moisture.	Number of samples.
16.1—17%	7
17.1—18%	5
18.1—19%	2
19.1—20%	4
Over 20%	9 (highest 26.6%)

All 25 samples examined for foreign matter contained less than five per cent.

The investigation into the leaf-fall from clove trees commenced in 1929 was continued. Table II (p. 24) shows the weight of air-dried leaves collected monthly from each of the three one-acre plots, the percentage oil content and the total weight of oil obtainable. The experiment is being discontinued. The total weight of leaves (air-dried) which fell on the three acres under observation during the three years was nearly 36 tons, or four tons per acre per annum. The total weight of oil which these leaves contained approached one and one-half tons, the exact average being 360 lbs. per acre per annum.

Some preliminary tests were made on citrus fruits grown on the experimental plots at Dunga to determine the sugar-acid ratio which is used as a criterion of quality in citrus fruit exporting countries. This matter will receive attention during the 1932 season.

An experiment was made to ascertain the effect of leaving green cloves in heaps to ferment, the results of which indicated that further investigation of this matter was desirable. This will be undertaken if possible during the next clove harvest.

(2) *Health*.—Routine examinations of soda waters were continued. In 52 samples tested the highest amount of copper found was 1/30th of a grain per gallon, and the amounts were generally much smaller than this. Twelve samples of sweetened mineral waters were examined and in every case the content of copper was unduly high, ranging from 1/24th to 1/5th of a grain per gallon. The matter was investigated in conjunction with the Health authorities and it was found that in some cases the concentrated syrups used in the manufacture of the mineral waters were being prepared in copper pans which had not been tinned or in which the tin coating was worn. Nine samples of these concentrated syrups were found to be heavily contaminated with copper, the amount in one case being 1.68 grain per gallon. Dilution of these syrups would give a final product containing approximately the amount of copper found in the sweetened mineral waters examined, so that the trouble arose mainly in the syrup pans: advice was given accordingly.

Of 15 samples of liquid from cattle-dipping tanks six were of correct strength, five were weak (11.2—18.7 per cent deficient) and four were above strength (6.5—11.6 per cent excess).

The stomach contents of two persons suspected of having committed suicide by poisoning were examined in great detail, but no poisonous substances were detected.

Other materials examined for the Hospital or the Health Department were a photographic developer which had caused decay of the nails and finger-tips of a native operator, an Indian medicine (found free from drugs prohibited under the Dangerous Drugs Decree), distilled water which had caused trouble in making up microscopic stains, two bottles of tablets (found to be respectively sodium salicylate and sulphonal), human milk, and a drug used in the treatment of leprosy (found free from poisonous alkaloids). Opium was determined in a liquid found in the possession of a person who had died under unusual circumstances. Samples from two drinking-water supplies were analysed.

Numerous chemical solutions required by the Health Department Laboratory were prepared and standardised in this Laboratory in accordance with the arrangement arrived at in 1930.

(3) *Police*.—Eight exhibits were examined in connexion with the death of the two persons referred to in (2) above. They consisted of vomit, medicines and articles found in the house in which these people died, but their analysis threw no light on the matter.

Alcohol was detected in all nine suspected liquids submitted by the Police, and the amount was estimated in eight cases. One sample of *tembo* (imported as “vinegar”) was found to contain 4.7 per cent by volume of alcohol and 3 per cent of acids (as acetic), and a sample of a liquor resembling *pombe* contained 6.8 per cent of alcohol and one per cent of acids.

All five exhibits submitted for opium consisted of that substance. Bhang was identified alone and in admixture with tobacco and in the bowl of a native pipe.

(4) *Customs*.—The alcoholic contents of one bitters, one perfume and eight flavouring essences were determined. Two perfumes were found to be non-alcoholic. No prohibited drugs were found in two imported medicines.

(5) *Other Departments*.—Three samples of water were analysed in connexion with further investigation into the working of the water-softening plant at the Electric Power Station, and the Director of Electricity and Wireless consulted the Laboratory before coming to the decision to instal the “Permutit” system of softening in place of the old lime treatment.

The Assistant Government Chemist visited Chake Chake, Pemba, in March, at the request of the Director of Public Works, to examine the water supply and to advise on the best method of safeguarding its purity. This matter has been made the subject of a separate report, in which chlorination of the supply is recommended.

It is satisfactory to note that Pemba Departments have begun to make use of the facilities afforded by the Laboratory.

During the year 78 written reports were sent out to Departments other than the Agricultural and to private firms. This number does not include copies of certificates under the Agricultural Produce (Export) Decree.

4. MISCELLANEOUS WORK.

During the year the Laboratory has been called upon to collect and prepare exhibits of agricultural produce for the Imperial Institute and the Eastern African Trade and Information Office in London and for municipal museums in Liverpool and Birmingham.

L. W. RAYMOND,
Assistant Government Chemist.

Zanzibar, 21st January, 1932.

TABLE II.

Month.	Weight of leaves, in lbs. (air dried).				Percentage of Oil by weight.				Weight of Clove-leaf Oil in lbs.			
	Blk. 1	Blk. 2	Blk. 3	Total.	Blk. 1	Blk. 2	Blk. 3	Total.	Blk. 1	Blk. 2	Blk. 3	Total.
January	493	707	1,795	2,995	3.55	4.09	3.50	17.5	28.3	62.8	108.6	
February	1,112	601	1,343	3,056	3.90	4.20	4.60	43.4	25.2	61.8	130.4	
March	556	554	933	2,043	2.85	3.35	2.85	15.8	18.6	26.6	61.0	
April	374	449	1,349	2,172	3.55	4.10	1.50	13.3	18.4	20.2	51.9	
May	152	92	584	828	2.75	3.80	4.20	4.2	3.5	24.5	32.2	
June	414	448	641	1,503	3.25	3.15	4.20	13.5	14.1	26.9	54.5	
July	1,964	2,879	3,804	8,647	4.10	4.20	4.40	80.5	120.9	167.4	368.8	
August	480	557	711	1,748	4.20	4.30	4.20	20.2	24.0	29.9	74.1	
September	384	232	1,010	1,626	3.15	3.80	4.30	12.1	7.8	43.4	63.3	
October	187	77	972	1,236	4.30	3.90	3.35	8.0	3.0	32.6	43.6	
November	204	446	587	1,237	3.05	3.35	4.30	6.2	14.9	25.2	46.3	
December	222	231	984	1,437	4.30	4.00	4.60	9.5	9.2	45.3	64.0	
Totals	6,542	7,273	14,713	28,528	...	...	...	244.2	287.9	566.6	1,098.7	
Averages	545	606	1,226	2,377	3.58	3.85	3.83	20.4	24.0	47.2	91.6	

APPENDIX.

TABLE 1.

Monthly Average Price of Cloves—Zanzibar Local.

Month.	1930.			1931.		
	Zanzibar.	Pemba.	Stems.	Zanzibar.	Pemba.	Stems.
	Rs. per fras.	Rs. per fas.	Rs. per fras.	Rs. per fras.	Rs. per fras.	Rs. per fras.
January	14.75	14.20	3.17	19.33	18.45	3.24
February	15.50	15.12	3.18	19.71	18.66	2.93
March	18.70	18.65	3.81	18.11	16.74	2.67
April	21.91	21.83	4.95	16.92	15.80	2.73
May	20.96	20.68	4.44	15.39	14.50	3.01
June	20.01	19.84	3.85	14.77	13.91	2.27
July	22.78	22.47	5.52	12.42	11.03	3.70
August	21.53	20.91	3.43	11.89	10.06	2.71
September	22.21	21.62	3.70	11.76	10.05	2.39
October	23.99	23.41	3.40	13.42	11.68	2.42
November	23.37	22.82	3.81	13.41	11.86	2.13
December	21.07	20.53	3.44	13.93	12.41	2.48
Yearly Average	20.56	20.17	3.89	15.09	13.76	2.72

All the above prices are "duty paid".

Prices for stems are F.O.B.

TABLE II.

Monthly Average Price of Copra—Zanzibar Local.

Month.	1930.		1931.	
	per frasila.	per ton.	per frasila.	per ton.
	Rs. cts.	£. s. d.	Rs. cts.	£. s. d.
January	2 97	14 5 2	2 11	10 2 7
February	3 50	16 16 0	2 18	10 9 3
March	3 00	14 8 0	2 22	10 13 1
April	3 12	14 19 6	2 23	10 14 1
May	3 40	16 6 5	1 94	9 6 3
June	3 00	14 8 0	1 53	7 6 10
July	2 81	13 9 9	1 83	8 15 8
August	2 69	12 18 2	1 63	7 16 5
September	2 70	12 19 2	1 49	7 3 0
October	2 48	11 18 1	1 80	8 12 9
November	2 58	12 7 8	1 94	9 6 3
December	2 55	12 4 10	2 04	9 15 10
Yearly Average	2 90	13 18 5	1 91	9 3 6

TABLE III.

Assistance to Clove Growers.

	1930.		1931.	
	Zanzibar.	Pemba.	Zanzibar.	Pemba.
(a) <i>Loans for Harvesting.</i> —				
Number of Loans	39	135	2	130
Amount of Loans	18,660	19,800	155	17,142
(b) <i>Free Storage of Cloves.</i> —				
Number of Advances	107	275	59	503
Amount of Advances	1,94,322	2,79,703	48,757.75	2,38,112.53
(c) <i>Produce sold through the C.G.A.</i> —				
	Cloves.	Stems.	Cloves.	Stems.
	Fras. lbs.	Fras. lbs.	Fras. lbs.	Fras. lbs.
Zanzibar Produce	10,370 09	1,392 19	11,423 22	30 14
Pemba Produce	25,568 20	—	30,351 29	144 23
Totals	35,938 29	1,392 19	41,775 16	175 02
				Copra.
				Fras. lbs.
				—
				358 33
				358 33

TABLE IV.

Clove Growers' Association Balance Sheet for the year ending 31st December, 1931.

	LIABILITIES.		ASSETS.	
		Rs. Cts.		Rs. Cts.
Advance by Treasury	...	3,65,408 13	Cash in hand	...
Sundry Creditors	...	2,015 15	Cash at Bank	...
Excess of Assets over Liabilities	...	4,565 24	Storage Advances due by members	...
			Harvesting Loans due by members	...
			Charges due by members	...
			Motor Lorry	...
Total	...	3,71,988 52	Total	3,71,988 52

TABLE V.

Protectorate clove crops for the past 35 seasons:—

Season.	Zanzibar.	Pemba.	Total.
	Fras.	Fras.	Fras.
1896/97	86,000	224,000	310,000
1897/98	48,000	157,000	205,000
1898/99	145,000	466,000	611,000
1899/1900	64,000	221,000	285,000
1900/01	37,000	200,000	237,000
1901/02	44,000	323,000	367,000
1902/03	172,000	252,000	424,000
1903/04	27,000	99,000	126,000
1904/05	81,000	654,000	735,000
1905/06	178,435	129,735	308,170
1906/07	63,004	203,496	266,500
1907/08	213,662	541,993	755,655
1908/09	165,727	449,691	615,418
1909/10	109,678	300,047	409,725
1910/11	52,100	139,307	191,407
1911/12	216,507	582,153	798,660
1912/13	31,018	104,368	135,386
1913/14	145,586	638,094	783,680
1914/15	194,920	331,389	526,309
1915/16	141,641	655,116	796,757
1916/17	208,716	302,919	511,635
1917/18	63,958	234,239	298,197
1918/19	259,273	565,229	824,502
1919/20	93,847	168,703	262,550
1920/21	231,831	316,446	548,277
1921/22	65,819	200,983	266,802
1922/23	291,417	690,498	981,915
1923/24	75,027	236,767	311,794
1924/25	240,952	520,490	761,442
1925/26	219,192	392,622	611,814
1926/27	203,843	529,186	733,029
1927/28	190,370	500,382	690,752
1928/29	74,828	125,740	200,568
1929/30	*280,296	*597,626	877,922
1930/31	51,796	201,320	253,116
Average 35 seasons	136,213	350,130	486,342

* These figures do not include 12,670 frassas from Pemba and 38,351 frassas from Zanzibar which were delivered to the Clove Growers' Association and which bring the total for the season to 928,943 frassas.

TABLE VI.

Export of Copra (Produced in the Protectorate) for the past 26 years
and average price per frasila of 35 lbs.

Year.	Fraslas.	Average for 6 years.	Average Price Rs. Cts.	Average 6 years. Rs. Cts.
1906	4,93,688		3 24	
1907	3,79,526		3 76	
1908	5,26,269		2 70	
1909	3,84,260		3 26	
1910	4,82,834		4 14	
1911	5,19,081		4 00	
		4,64,276		3 52
1912	4,76,866		4 19	
1913	4,74,868		4 85	
1914	5,38,112		3 87	
1915	5,49,472		3 73	
1916	3,50,238		4 72	
1917	4,21,316		7 10	
		4,68,812		4 75
1918	2,03,616		3 71	
*1919	9,07,329		5 31	
1920	5,38,595		6 59	
1921	4,99,907		6 60	
1922	4,69,878		5 33	
1923	6,01,110		4 82	
		5,36,739		5 38
1924	6,54,454		4 85	
1925	7,98,803		4 49	
1926	8,18,570		4 34	
1927	6,43,350		4 19	
1928	5,98,966		4 27	
1929	7,44,246		3 19	
		7,09,731		4 22
1930	8,19,081		2 90	
1931	7,53,216		1 91	

*Large holdover from previous year due to shortage of shipping.

TABLE VII.

Annual Clove Shipments from Pemba.

Year.	WETE DISTRICT.						CHAKE-CHAKE DISTRICT.				MKOANI DISTRICT.				Total Pemba.
	Wete.	Mtambwe.	Junguni.	Kipangani. (Matangani- twani)	Msuka.	District Total.	Chake.	Kiswani.	District Total.	Jambau- gome.	Mkoani.	Fufuni.	Korogwe.	District Total.	
	Fs.	Fs.	Fs.	Fs.	Fs.	Fs.	Fs.	Fs.	Fs.	Fs.	Fs.	Fs.	Fs.	Fs.	Fs.
1914	88,433	13,786	5,721	8,666	6,594	1,23,200	85,779	23,550	1,09,329	45,013	13,988	10,947	21,826	91,804	3,24,333
1915	1,61,655	26,072	12,992	21,738	11,126	2,35,583	1,46,913	40,330	1,98,243	79,069	26,732	40,228	46,693	1,92,722	6,21,548
1916	1,17,387	26,709	12,168	7,305	5,950	1,69,519	84,807	28,707	1,13,514	62,931	14,788	22,144	42,279	1,42,142	4,25,175
1917	20,951	13,135	5,248	7,828	4,449	50,611	23,096	8,011	31,107	3,111	4,654	12,010	10,850	50,628	1,32,346
1918	76,309	17,786	15,555	10,503	5,429	1,25,582	1,25,634	16,032	1,41,666	74,254	28,153	10,583	37,815	1,50,504	4,18,052
1919	1,40,562	18,810	10,269	7,427	5,763	1,82,831	77,261	28,463	1,05,724	51,370	16,964	13,876	26,807	1,09,017	3,97,572
1920	31,674	3,304	1,010	1,001	4,874	41,863	30,311	7,199	35,810	16,433	2,096	6,923	11,823	37,275	1,14,948
1921	1,04,339	12,302	10,659	7,714	9,663	1,44,663	93,601	20,740	1,14,341	12,484	55,703	26,131	44,756	1,39,074	3,98,088
1922	1,18,000	17,700	3,400	7,500	6,700	1,53,800	1,07,000	37,500	1,44,500	76,500	16,200	51,100	45,400	1,89,200	4,87,000
1923	1,33,688	29,244	18,814	12,308	4,897	1,98,951	1,19,289	34,196	1,53,485	51,079	15,490	27,149	49,595	1,45,313	4,97,749
1924	83,472	26,387	7,109	7,225	4,946	1,34,139	97,033	25,516	1,32,549	56,240	30,153	38,806	37,254	1,62,453	4,29,141
1925	72,322	31,115	6,870	12,520	7,403	1,30,230	1,25,808	61,752	1,87,560	64,239	18,842	38,196	56,448	1,77,725	4,95,515
1926	57,588	24,492	3,773	3,408	1,879	91,140	71,571	28,314	99,913	35,570	10,629	16,189	37,432	99,920	2,90,975
1927	2,26,479	28,973	13,967	30,322	16,491	3,16,242	1,07,563	41,450	1,49,013	78,319	38,937	24,923	35,140	1,77,319	6,42,574
1928	62,454	27,955	4,888	7,602	3,780	1,06,739	77,746	28,967	1,06,713	53,478	36,086	42,041	42,041	1,41,173	3,54,625
1929	1,03,434	23,066	11,327	5,786	2,776	1,46,389	1,46,036	30,331	1,76,567	46,134	35,183	13,417	56,836	1,51,570	4,74,526
1930	1,45,367	6,230	4,132	1,103	1,034	1,57,868	85,742	12,510	98,252	28,031	36,313	11,217	44,153	1,19,714	3,75,831
1931	1,98,732	12,575	6,678	79	464	2,18,528	1,71,698	8,396	1,80,094	36,908	85,544	16,619	60,576	1,99,647	5,98,249
Average 18 years.	1,08,382	19,871	8,587	8,891	5,790	1,51,521	98,716	27,551	1,26,299	49,628	27,025	21,668	39,318	1,37,639	4,15,459

TABLE VIII.

Meteorological Observations, 1931.

Month.	Temperature.						Rainfall.										Sunshine.					
	Zanzibar Town.			Banani, Pemba.			Zanzibar.					Pemba.						Zanzibar Town				
	Means of		Absolute	Means of		Absolute	Town.	Seleni.	Kidichi.	Koani.		Mko-kotoni	Chwaka.	Wete.	Banani.	Mkoani.			Futuni.	Kigo-macha.	Hours.	Average.
	Max.	Min.	Max.	Min.	Max.	Min.																
										Max.	Min.											
January	87.1	81.2	89.9	78.2	89.0	81.0	79.0	2.54	1.86	1.29	0.68	1.31	1.75	0.55	1.09	1.71	1.79	0.12	285.6	9.21		
February	87.8	80.9	93.5	75.1	90.2	81.1	77.5	10.93	6.27	10.99	4.99	5.57	6.40	4.15	3.96	5.02	3.34	2.14	230.7	8.23		
March	88.7	81.1	92.0	76.7	90.8	81.6	78.0	3.05	8.67	8.03	5.83	7.05	4.60	4.56	5.90	1.79	5.13	1.33	250.6	8.08		
April	85.7	78.6	90.5	75.3	88.7	78.9	77.0	14.35	10.92	12.83	18.35	15.37	13.14	11.32	12.72	14.71	13.75	6.39	293.3	6.40		
May	83.1	76.3	87.0	73.2	84.7	76.0	73.0	19.42	15.41	24.32	15.67	14.48	21.16	34.71	35.38	28.44	35.21	26.89	137.8	4.44		
June	82.5	75.0	84.5	72.6	85.4	75.8	73.0	0.94	1.71	1.46	2.84	3.14	2.40	5.92	5.81	5.55	6.91	3.80	118.6	3.95		
July	82.4	74.7	84.2	73.0	85.1	75.1	73.0	1.12	1.71	1.23	2.32	0.52	1.88	4.71	4.91	6.06	4.71	6.43	181.7	5.86		
August	83.1	74.6	85.9	73.5	85.9	74.3	71.5	0.66	3.60	4.03	3.40	1.41	2.15	3.01	1.82	0.82	0.64	2.21	265.8	8.57		
September	83.6	74.5	86.9	72.2	85.6	74.4	72.5	2.86	2.69	1.61	1.02	1.46	0.30	1.28	1.31	1.82	1.45	4.92	259.2	8.64		
October	84.0	75.6	86.0	73.6	87.0	75.3	73.5	3.00	2.21	2.36	2.54	1.40	0.67	4.42	3.31	1.78	2.53	7.29	276.1	8.90		
November	85.9	74.9	87.7	76.0	87.7	71.1	75.0	5.52	6.52	5.47	7.81	0.88	0.65	7.45	7.37	11.36	4.00	3.19	300.3	10.10		
December	86.1	79.3	88.3	75.7	88.5	78.6	75.5	7.39	5.33	4.57	8.89	3.54	1.92	8.04	5.86	3.13	12.51	2.40	258.4	8.33		
For the year	85.0	77.2	93.5	72.2	87.4	77.0	71.5	71.78	67.00	67.19	74.34	56.13	57.02	30.12	89.44	82.19	91.97	67.11	2758.1	7.56		

